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has afforded the writer more pleasure than the privilege, in association with Mr. A. W. Grabau, of giving the name of our friend to the glacial lake which once adorned that region, and was a controlling factor in the development of the surface geology. Mr. Bouvé lived long enough to note the general and cordial acceptance of this name; and I venture to hope that it may long endure as a fitting memorial of this earliest and most devoted student of the geology of the district which embraces Lake Bouvé.

W. O. CROSBY.

FRANCIS AMASA WALKER.

FRANCIS AMASA WALKER, late President of the Massachusetts Institute of Technology, and a Fellow of this Academy from October, 1882, was born in Boston, July 2, 1840, and died of apoplexy in that city, January 5, 1897.

His father, the late Amasa Walker of North Brookfield, was a well known figure in the political life of Massachusetts for many years. He was a leader in the Free Soil movement of 1848, and in the subsequently combined opposition to the Whig party. He served in each branch of the Legislature, was for two years Secretary of the Commonwealth, was a Presidential Elector in 1860, and a member of the lower House of Congress for the session of 1862-63. From 1842 to 1848 he lectured on political economy in Oberlin College, and was afterwards a frequent writer for periodicals, especially upon topics connected with finance and banking, in which he also showed special interest when in Congress. From 1859 to 1869 he was Lecturer upon Political Economy in Amherst College, publishing during that time his well known book, the "Science of Wealth," and died in 1875.

Francis Amasa Walker, the son, thus grew up with an inherited predilection and aptitude for economic study, strengthened by the associations of boyhood and youth. When he graduated from Amherst College in 1860, however, his first step was to enter as a student of law the office of Charles Devens and George F. Hoar of Worcester, — both gentlemen destined, like himself, soon to attain national reputation. On the breaking out of the Civil War in 1861, Mr. Devens at first took the field as an officer of militia, and, when later he raised the Fifteenth Regiment of Massachusetts Infantry in Worcester County, young Walker enlisted and was mustered into the service as Sergeant Major, August 1, 1861. Ten days later, he was commissioned and assigned to the staff of

General Couch. From that time he was upon duty with the Army of the Potomac, serving with advancing rank upon the staff of Generals Warren and Hancock through some of the severest campaigns of the war. He resigned his commission in January, 1865, from illness contracted while a prisoner within the Confederate lines, received the brevet rank of Brigadier General "for distinguished service and good conduct," and returned to civil life bearing the honorable scars of the brave. It afterwards fell to his lot, in his "History of the Second Army Corps" (1886), and his "Life of General Hancock" (1894), to write the narrative of events no small part of which had passed before his eyes. Little of his own history is to be found in those glowing pages, but every line bears witness to the intense enthusiasm with which he never failed to kindle when he recalled his army life, and to his devotion to the great captains under whom he served.

Like many other young men, who, as soldiers in the War for the Union, drank the wine of life early, General Walker came home with his character matured, his capacities developed, his intellectual forces aroused and trained, — a man older than his years. The career in which he was to win new distinction did not open for him at once upon the sudden return of peace. For three years he was a teacher of the classics in Williston Seminary, and in 1868, being compelled by an attack of quinsy to seek a change of occupation, he became an assistant of Mr. Samuel Bowles, editor of the Springfield Republican. From this place he was drawn into the public service at Washington, by the agency of Mr. David A. Wells, who was then Special Commissioner of the Revenue, and in search of a new Chief for the Bureau of Statistics. The work of the Bureau had fallen into some discredit, and was far in arrears, and the inability of the former Chief of the Bureau to command the confidence of Congress seriously embarrassed the continuance of an important work. By Mr. Wells's advice General Walker was made Deputy Special Commissioner and placed in charge of the Bureau, and a new career was at once opened before him, for which he was fitted in a peculiar manner both by his intellectual interests and his administrative capacity. The Bureau was reorganized and its reputation was regained. The monthly publications were resumed, and soon showed that progressive improvement which has made them one of the most valuable repositories in existence for the study of the commercial and financial activity of a great country.

From his appointment to the charge of the Bureau of Statistics the steps in General Walker's new career followed in rapid succession. In 1870 he was appointed Superintendent of the Ninth Census of the

United States; in 1871 he was appointed Commissioner of Indian Affairs; in 1872 he was made Professor of Political Economy and History in the Sheffield Scientific School of Yale College; in 1876 he was Chief of the Bureau of Awards for the Centennial Exposition in Philadelphia; in 1878 he was sent as a Commissioner for the United States to the International Monetary Conference at Paris; in 1879 he was appointed Superintendent of the Tenth Census of the United States; in 1881 he was made President of the Massachusetts Institute of Technology; in 1882 he was elected President of the American Statistical Association; in 1885 he was elected first President of the American Economic Association; in 1891 he was elected Vice-President of the National Academy of Sciences; in 1893 he was President-adjunct of the International Statistical Institute, at its session in Chicago.

General Walker's successive appointments as Superintendent of the Census of 1870 and of that of 1880 were the direct result of the energy and skill with which, during the months of his service in the Bureau of Statistics, he had effected the reorganization of that office and its work. The opportunities given to him as a statistician, by having charge of these two censuses, were of a remarkable kind. The census of 1870, being the first taken after the Civil War, was for that reason by far the most interesting and important since 1790. It was to show the social and economic changes wrought by four years of prodigal expenditure both of life and of resources, and by the unparalleled revolution in the industrial organization of the former slave States. It was also to ascertain and record the conditions under which the nation entered upon a new and wonderful stage of its material growth. The census of 1880 was the unique occasion for what General Walker designed as a "grand monumental exhibit of the resources, the industries, and the social state of the American people," made approximately at the close of a century of national independence.

The Census of 1870, to the great regret of all who had any scientific interest in the subject, was left by Congress to be taken under the provisions of the Census Act of 1850, by persons neither selected nor controlled by the Census Office. In the still disturbed condition of some of the Southern States, the work was thus thrown into the hands of men notoriously unfit for such employment, and the returns, especially of the black population, were vitiated at their source. In his Report of 1872, and in his Introduction to the "Compendium of the Census of 1880," General Walker described in strong language the difficulties which thus beset the work in 1870; and again in the Publications of the American Statistical Association for December, 1890, writing upon the "Statistics of the

Colored Race in the United States," he used his freedom from official relations in exposing the mischief done by legislative failure to provide intelligently for an important public service. As a whole, however, the Census of 1870 was the best and the most varied in its scope that had yet been obtained for the United States. It was, after all, a signal proof of what can be done by a competent head, even with imperfect legislation, and established the reputation of the Superintendent as an administrative officer, at the same time that his fresh and vigorous discussion of results secured him high rank among statistical writers. Great interest was excited, moreover, by the remarkable use made of the graphic method in presenting the leading results of this census, in his "Statistical Atlas of the United States" (1874).

The Act providing for the Census of 1880 was greatly modified, by General Walker's advice, and the working force was for the first time organized upon an intelligent system, by the employment of specially selected enumerators in place of the subordinates of the United States marshals, to whom the law had previously intrusted the collection of returns. Highly qualified experts were also employed for the historical and descriptive treatment of different industries and interests, as demanded by the monumental character of the centennial census. Various causes delayed the completion of this gigantic undertaking. Those to whom a census is merely a compendious statement of passing facts became impatient at the slow issue of the twenty-two stately quartos, and complained that the work was on such a scale as to be obsolescent before its appearance. General Walker, in an article in the *Quarterly Journal of Economics* for April, 1888, explained some of the special causes of the delay in publication and took upon himself perhaps an undue share of responsibility for the difficulties caused by an original underestimate of the total cost of the census. But notwithstanding its misfortunes, the Census of 1880 is a great work of enduring value and not excessive cost, — great in its breadth of design, worthy of the nation and of the epoch, and a lasting monument of the power of its Superintendent to conceive and to execute. Following the Census of 1870, it won for him universal recognition as one of the leading statisticians of his time.

In the article to which reference has just been made, General Walker, in his discussion of future arrangements for the national census, offered as the fruits of his own experience some valuable suggestions, which deserve more attention than they have yet received. It is hardly necessary, however, to enter upon them here, except to recall the fact that he advised the organization of the Census Office as a permanent establish-

ment, in order to secure the improved service and economy of a trained force of moderate size, constantly employed. Upon an office thus organized could be laid, at the regular intervals, the duty of collecting and preparing the returns of population and of agriculture for the decennial census required by the Constitution, and perhaps for an intermediate fifth year enumeration, and also in the intervals the systematic prosecution of other statistical investigations, to be charged upon the office from time to time as occasion might require.

General Walker's appointment as Professor in the Sheffield Scientific School, in 1872, carried him beyond the boundary of statistics into the general field of political economy. His training for this extended range of work, although obtained by a less systematic process than is now usual, had begun early, and as opportunity offered was carried on effectively. In one of his prefaces, he remarks that he began writing for the press upon money in 1858, probably having in mind a series of letters to the *National Era* of Washington, beginning soon after the crisis of 1857, and continued for some months, noticeable for sharply defined views on the subjects of banking and currency, and also as to the merits of Mr. Henry C. Carey as an economist. In 1865, before going to Williston Seminary, he lectured upon political economy for a short time at Amherst in his father's absence, and in 1866 his father recognized with pride his important assistance in finishing the "*Science of Wealth*." From the close of the war, he is otherwise known to have been a keen student of economics, although a student under such limitations and so hampered by pressing occupations as to make it difficult for him to do equal justice to all parts of his outfit. It was perhaps from this cause, in part, that his earliest important publications as an economist were two treatises on widely separated topics, "*The Wages Question*" and "*Money*."

The earlier of these two books, "*The Wages Question*" (1876), instantly attracted the attention both of economists and of the general public by its lively and strong discussion of the central topic of the day, then more commonly treated either as a matter of dry theory, or as a problem to be settled by sentiment. Following Longe and Thornton, the author made an unsparing attack upon the wages fund theory, and, arguing that wages are paid from the product of labor and not from accumulated capital, he set forth with great vigor the influences which affect the competition between laborer and employer in the division of this product. General Walker's earliest public statement of his now familiar opinions touching the wages fund, and the payment of wages from the product, was made, it is believed, in an address delivered before the literary societies

of Amherst College, July 8, 1874, and he further developed the subject in an article contributed to the *North American Review* for January, 1875. Few books in political economy have taken a place in the foreground of scientific discussion more quickly than "The Wages Question." Many economists followed the author's lead with little delay, and those who were slower to admit that the object of his attack was in fact the wages fund of the older school, recognized his assault as by far the most serious yet made. Unquestionably it compelled an immediate review of a large body of thought by the great mass of economic students in the English speaking countries.

In "The Wages Question," General Walker drew the line clearly between the function of the capitalist and that of the employer, or *entrepreneur*, and between interest, which is the return made to the former, and profits, which are the reward of the latter. It was however in his "Political Economy" (1883), that he worked out his theory of the source of business profits and of the law governing the returns secured by the employing class. This enabled him to lay down a general theory of distribution, to be substituted for that associated with the wages fund theory, which he regarded as completely exploded, and indeed "exanimate." Of the four parties to the distribution of the product of industry, three, the owner of land, the capitalist, and the employer, in his view, receive shares which are determined, respectively, by the law of Ricardo, by the prevailing rate of interest, and by a law of business profits analogous to the law of rent. These shares being settled, each by a limiting principle of its own, labor becomes the "residual claimant," be the residue more or less, and any increase of product resulting from the energy, economy, or care of the laborers "goes to them by purely natural laws, provided only competition be full and free." So too the gains from invention enure to their benefit, except so far as the law may interfere by creating a monopoly. This striking solution of the chief problem of economics attracted wide attention, and was further expounded and defended by its author in the discussions which it provoked, as may be seen by reference to the earlier volumes of the *Quarterly Journal of Economics*. Indeed, in his last published work, "International Bimetallism" (page 283), he prefaces a statement of his theory by saying, "I have given no small part of my strength during the past twenty years to the advocacy of that economic view which makes the laborer the residual claimant upon the product of industry."

General Walker published his treatise, "Money" (1878), at a moment singularly opportune for the usefulness of the book and the ad-

vancing reputation of its author. Public opinion in the United States was in extreme confusion on the questions involved in the return to specie payment; there was a formidable agitation for the repeal of the Resumption Act, and Congress was entering upon its long series of efforts to rehabilitate silver as a money metal. At this juncture, when every part of the theory of money was the subject of warm discussion, scientific and popular alike, General Walker, using the substance of a course of lectures delivered by him in the Johns Hopkins University in 1877, laid before the public an elaborate and broad-minded survey of the whole field, claiming little originality for his work, but giving material help in concentrating upon scientific lines a discussion which was wandering in endless vagaries. On the general subject his views had no doubt been formed early, under the influence of his father, to whom, in more than one passage of this book, he makes touching allusion, and later in life he found in them little to change, although the long *régime* of paper money and its consequences suggested many things to be added. In 1879 he published, under the title of "Money in its Relations to Trade and Industry," what was in some sense an abridgment of the larger work, made for use in a course of lectures in the Lowell Institute; and in his "Political Economy" he again condensed his arguments and conclusions as to money, as part of his discussion of the grand division, Exchange.

When the International Monetary Conference met in 1878, by invitation of the United States, General Walker went to Paris as one of the commissioners for this country. His discussion of bimetallism had not been carried in "Money" much beyond a careful statement of the question and of the arguments on each side, but it was carried far enough to show that international bimetallism, and not the simple remonetization of silver by the United States, was, in his view, the proper method of securing what he deemed an adequate supply of money for this country and for the commercial world. Great emphasis was laid, in "Money, Trade, and Industry," upon the necessity for "concerted action by the civilized states," and this ground was consistently held by him until his share in the discussion ended with the publication of "International Bimetalism" (1896), a few months before his death. In this book, which was the outcome of a course of lectures delivered in Harvard University, after reviewing the controversy over silver, which had more and more engaged his attention as time went on, he declared more vigorously than ever his opinion of the futility of the policy of solitary action, adopted by the United States in the Act of 1878. "International Bimetalism"

appeared in the midst of a heated Presidential canvass, in which the issues had taken such form that some, who like himself were supporters of "sound money," found a jarring note in what they regarded as needless concessions to "free silver," and in the sharp phrase in which his ardor and deep conviction sometimes found expression. But the book was not written for effect upon an election; it was the last stroke of a soldier, in a world-wide battle, — soon to lay aside his arms.

It was General Walker's good fortune to enter the field as an economist when the study of economics was gaining new strength in the United States from the powerful stimulus of the Civil War, and of the period of rapid material development and change which followed. The revision of all accepted theories which set in did not displease him, and he took his share in the ensuing controversies, whether raised by himself or others, with equal zest. His own tendency, however, was towards a rational conservatism, and his modes of thought never ceased to show the influence of writers, French and English, of whom he appeared to the superficial observer to be the severe critic. "A Ricardian of the Ricardians" he styled himself in his Harvard lectures on land, published under the title of "Land and its Rent" (1883). His theory of distribution, if enunciated by one of narrower sympathies than himself, might have been thought to be designed as a justification of the existing order of things. In his monetary discussions he contended for a return to what he deemed the safe ways of the past. As for his view of the future, in a public address in 1890, after a remarkable passage describing the sea of agitation and debate which had submerged the entire domain of economics, and threatened to sweep away every landmark of accepted belief, he said, "I have little doubt that in due time, when these angry floods subside, the green land will emerge, fairer and richer for the inundation, but not greatly altered in aspect or in shape."

The election of General Walker as the first President of the American Economic Association, in recognition of his acknowledged eminence, deserves a passing notice at this point. The Association was organized at Saratoga in 1885, under circumstances which threatened to make it the representative of a school of economists rather than of the great body of economic students in America, and with a dangerous approach to something like a scientific creed. General Walker cannot be said to have represented any particular school. He was both theorist and observer, the framer of a theory of distribution, and also an industrious student of past and current history. By a happy choice the new Association strengthened its claim upon public attention by electing him its

President, in his absence; and he wisely took his place at its head, with the conviction that its purposes were better than the statement made of them, and that the membership of the new organization gave promise of good results for economic science. Under his administration, which lasted until 1892, the basis of the Association was broadened, all appearance of any test of scientific faith disappeared, and American economists found themselves associated in catholic brotherhood. In part this change was no doubt due to the marked subsidence of the debate as to the deductive and the historical methods, but in part also it was due to the good judgment, personal influence, and perhaps in some instances the persuasive efforts of the President, who thus rendered no small service to economic science.

Which of General Walker's contributions to economic theory are likely to have lasting value, is a question not yet ready for decision. The subjects to which he specially devoted his efforts are still under discussion. His theory of distribution is not yet established as the true solution of the great problem; the wages fund has not yet ceased to be controversial matter; it is not yet settled whether the advocates or the opponents of bimetallism are to triumph in the great debate of this generation. But whether as a theoretical writer he is to hold his present place or to lose it, there can be no question as to the importance of his work, in imparting stimulus and the feeling of reality to all economic discussions in which he had a part. His varied experience and wide acquaintance with men had made him in a large sense a man of affairs. He watched the great movements of the world, not only in their broad relations, but as they concern individuals. He was apt to treat economic tendencies, therefore, not only in their abstract form, but also as facts making for the happiness or the injury of living men. Economic law was reasoned upon by him in much the same way as by others, but he never lost his vivid perception of the realities among which the law must work out its consequences. In his pages, therefore, theory seemed to many to be a more practical matter and nearer to actual life than it is made to appear by most economists. His words seemed to carry more authority, his illustrations to give more light, the whole science to become a lively exposition of the trend and the side movements of a world of passion and effort. A great English economist has said that Walker's explanation of the services rendered by the *entrepreneur* remind one of passages of Adam Smith. A great service has been rendered to the community by the writer who, in our day, has been able thus to command attention to political economy as a discussion belonging to the actual world.

General Walker's election to the Presidency of the Massachusetts Institute of Technology, in 1881, placed him at the head of an institution badly in need of a vigorous, confident, and many-sided administrator, for the development of its great possibilities. The plan on which it should work had been prepared and its foundations laid broad and deep by President Rogers, but the work itself was still languishing, endowment and equipment were scanty, and the number of students declining. General Walker's administration was signalized by a sudden revival of the school. Funds were secured, new buildings were built, the confidence of the public won, and at General Walker's death the school of barely two hundred students, still maintaining the severe standard of work set by its founder, had upon its register nearly twelve hundred students and maintained a staff of one hundred and thirty professors and instructors of different grades. Of the qualities as an educator and administrator of a great technical school displayed by General Walker in this brilliant part of his career, a striking description, made from close observation, has been given by Professor H. W. Tyler of the Faculty of the Institute, in the *Educational Review* for June, 1897.

There was doubtless much in the circumstances attending the foundation of the Institute of Technology which any disinterested friend of scientific education must now regret. But time has healed wounds and removed jealousies which divided a former generation, and none can now be found to question either the practical or the scientific value of the great institution conceived by Rogers, and brought to its present deserved eminence under the successor of whose day he lived to see little more than the dawn.

At no period of General Walker's life did he fail to take an active interest in the work of the community in which he lived. That he was already charged with great responsibilities was a reason, both with his fellow citizens and with himself, for increasing the load. An early instance of this was his service as Commissioner of Indian Affairs for one year while still in charge of the census of 1870, — a service marked by an annual report remarkable for its thorough review of the whole subject, and by the appearance of his book, "The Indian Question" (1874). At different times, in New Haven and in Boston, he was a member of the local School Board and of the State Board of Education. He was a Trustee of the Boston Public Library and of the Museum of Fine Arts, one of the Boston Park Commissioners, and an almost prescriptive member of any more temporary board or committee. In some of these capacities his labors have left their traces in his written works,

in others his name gave weight to organizations in which he was not called upon for active effort. The number and variety of the appointments thus showered upon him marked not only the unbounded range of his own interests, but the confidence of others that every appeal to public spirit would stir his heart.

The bibliography of his written work, prepared at the Institute of Technology and revised with great care since his death, will be found in the Publications of the American Statistical Society for June, 1897. It is a remarkable record of intellectual activity, maintained for nearly forty years, and resulting in a series of important contributions to the thought of his time,—a manifold claim to eminence in the world of science and letters.

A complete list of the honorary degrees and other marks of distinction conferred upon General Walker by public bodies, at home and abroad, cannot be undertaken here. It is enough to say that he was made Doctor of Laws by Amherst, Columbia, Dublin, Edinburgh, Harvard, St. Andrews, and Yale, and Doctor of Philosophy by Amherst and Halle; that he was a member, regular or honorary, of the National Academy of Sciences, the Philosophical Society of Washington, the Massachusetts Historical Society and this Academy, of the Royal Statistical Society of London, the Royal Statistical Society of Belgium, the Statistical Society of Paris, the French Institute, and the International Statistical Institute; and that he was an officer of the French Legion of Honor.

General Walker was endowed by nature with peculiar gifts for a career of distinction. In any company of men he instantly drew attention by his solid erect form and dignified presence, by his deep and glowing eye, and by his dark features, cheerful, often mirthful, always alive. His instant command of his intellectual resources gave him the confidence needed for a leading place, and his friendly bearing, strong judgment, and easy optimism made others welcome his leadership. His convictions were deep, and his opinions, once formed, were shaken with difficulty, for in discussion he had the soldier's quality of not knowing when he is beaten. His ambition was strong, and he liked to feel the current of sympathy and approval bearing him on, but he did not shrink from his course if others refused to follow. From first to last, he grappled with large undertakings and large subjects, conscious of powers which promised him the mastery. Such as his contemporaries saw him he will live for the future reader in many a sentence and page,—cheerful, courageous, hopeful.

CHARLES F. DUNBAR.